WHAT IS CLAIMED IS:

1. A thermal infrared detector having a thermal isolation structure and comprising a substrate having an infrared reflecting film formed on a surface thereof, a thin-film infrared detecting portion which is separated by a cavity from the surface of the substrate and which absorbs an infrared ray incident thereto and generates heat to thereby detect incidence of the infrared ray as temperature change, a beam separated by a gap from the infrared detecting portion and supporting the infrared detecting portion separated by the cavity from the substrate, and an electrode portion and a metal wiring each of which is made of a conductive material and which establish electrical connection between predetermined portions, the thermal infrared detector further comprising:

a shield which extends from an outer perimeter of the infrared detecting portion separated by a gap from the beam so as to cover the beam on an infrared incident side with a space interposed between the beam and the shield and which has an infrared absorbing function together with the infrared detecting portion;

the beam being greater in thickness than the infrared detecting portion in a direction perpendicular to the surface of the substrate.

2. A thermal infrared detector according to claim 1, wherein:

the infrared detecting portion has an infrared absorbing film formed on an infrared incident surface thereof;

the shield having an infrared absorbing film formed on at least one of an infrared incident surface and an opposite surface thereof.

3. A thermal infrared detector according to claim 1, wherein:

each of the infrared detecting portion and the shield is covered with a dielectric protective film made of an infrared absorbing material.

4. A thermal infrared detector having a thermal isolation structure, the thermal infrared detector comprising, in each pixel area:

a substrate having a contact pad;

an infrared detecting portion which comprises a heat detecting material thin film, an electrode portion electrically connected to the heat detecting material thin film, a dielectric protective film surrounding the electrode portion and the heat detecting material thin film, and an infrared absorbing film and which is separated by a space from one surface of the substrate and arranged above the one surface;

a beam which supports the infrared detecting portion above the substrate so that the infrared detecting portion is afloat above and separated from the one surface of the substrate and which has a wiring made of a conductive material and electrically connecting the electrode portion of the infrared detecting portion to the contact pad of the substrate, the conductive material being surrounded by a dielectric protective film greater in thickness than the dielectric protective film of the infrared detecting portion in a direction perpendicular to the surface of the substrate; and

a shield extending outward from an outer perimeter of the infrared detecting portion so as to cover one surfaces of the beam and the contact pad which are opposite to substrate-facing surfaces with an interposed space from the one surfaces of the beam and the contact pad, the shield having an infrared absorbing film formed on at least one of an infrared incident surface and an opposite surface thereof.

5. A thermal infrared detector having a thermal isolation structure, the thermal infrared detector comprising:

a substrate having a contact pad;

an infrared detecting portion which comprises a heat detecting material thin film, an electrode portion electrically connected to the heat detecting material thin film, a dielectric protective film made of an infrared absorbing

material and surrounding the electrode portion and the heat detecting material thin film and which is separated by a space from one surface of the substrate and arranged above the one surface;

a beam which supports the infrared detecting portion above the substrate so that the infrared detecting portion is afloat above and separated from the one surface of the substrate and which has a wiring made of a conductive material and electrically connecting the electrode portion of the infrared detecting portion to the contact pad of the substrate, the conductive material being surrounded by a dielectric protective film greater in thickness than the dielectric protective film of the infrared detecting portion in a direction perpendicular to the surface of the substrate; and

a shield made of an infrared absorbing material and extending outward from an outer perimeter of the infrared detecting portion so as to cover one surfaces of the beam and the contact pad which are opposite to substrate-facing surfaces with an interposed space from the one surfaces of the beam and the contact pad, the shield having an infrared absorbing film formed on at least one of an infrared incident surface and an opposite surface thereof.

6. A method of producing a thermal infrared detector having a thermal isolation structure and comprising a substrate having an infrared reflecting film formed on a surface thereof in each pixel area, a thin-film infrared detecting portion which is separated by a cavity from the surface of the substrate, which is provided for each pixel, and which absorbs an infrared ray incident thereto and generates heat to thereby detect incidence of the infrared ray as temperature change, and a beam separated by a gap from the infrared detecting portion and supporting the infrared detecting portion separated by the cavity from the substrate, and an electrode portion and a metal wiring each of which is made of a conductive material and which establish electrical connection between predetermined portions, the method comprising the steps of:

preparing the substrate having a contact pad;

forming, on a surface of the substrate on which the contact pad is present, the infrared reflecting film at a portion corresponding to the infrared detecting portion;

forming a first dielectric protective film throughout an entire surface of the substrate, including a surface of the infrared reflecting film;

forming, on the surface of the substrate on which the contact pad is present, a first sacrificial layer for forming the cavity;

forming a second dielectric protective film on a surface of the first sacrificial layer;

forming a heat detecting material thin film on a surface of the second dielectric protective film at a portion corresponding to the infrared detecting portion;

forming a third dielectric protective film throughout an entire surface of an exposed part of the second dielectric protective film except a part of the heat detecting material thin film;

forming openings in each of the first, the second, and the third dielectric protective film at a portion corresponding to the contact pad and in the heat detecting material thin film at a portion corresponding to the electrode;

forming a metal film throughout an entire surface of the third dielectric protective film and an entire inner wall of each of the openings;

patterning the metal film so that the third dielectric protective film is exposed to form the electrode of the infrared detecting portion and the metal wiring of the beam;

forming a fourth dielectric protective film on a surface of each of the metal wiring and the third dielectric protective film;

patterning the second, the third, and the fourth dielectric protective films so that the first sacrificial layer is exposed, to thereby form a first slit as a gap between the infrared detecting portion and the beam and a boundary slit as a boundary between adjacent pixels;

etching the fourth dielectric protective film on the infrared detecting portion so that the thickness of the fourth dielectric protective film is reduced, to thereby form a fifth dielectric protective film;

forming an etch stopper metal thin film on the fifth dielectric protective film of the infrared detecting portion except an area to become an end portion of a shield which extends from an outer perimeter of the infrared detecting portion separated by a gap from the beam so as to cover the beam on an infrared incident side with a space interposed between the beam and the shield

forming, on the surface of the fourth dielectric protective film, a second sacrificial layer for forming the first slit and the boundary slit each having an exposed surface of the first sacrificial layer at the bottom, a space between the beam and the shield, and a space between the contact pad of the substrate and the shield;

forming a shield-forming dielectric protective film for forming the shield, on the second sacrificial layer, an exposed surface of the fifth dielectric protective film, and an exposed surface of the etch stopper metal thin film;

etching the shield-forming dielectric protective film in an area above the infrared detecting portion except a base of the shield to expose the etch stopper metal thin film;

etching and removing the etch stopper metal thin film to expose the fifth dielectric protective film;

patterning the shield-forming dielectric protective film so as to expose a part of the second sacrificial layer is exposed, thereby forming a second slit; and

removing the second and the first sacrificial layers through the second slit, the first slit, and the boundary slit.

7. A method according to claim 6, wherein the step of etching and removing the etch stopper metal thin film to expose the fifth dielectric protective film is followed by a step of forming an infrared absorbing film comprising a

metal thin film on surfaces of the shield-forming dielectric protective film and the fifth dielectric protective film, the infrared absorbing film being patterned in addition to the shield-forming dielectric protective film in the subsequent step of patterning the shield-forming dielectric protective film so that a part of the second sacrificial layer is exposed, to thereby form the second slit.

8. A method according to claim 6, wherein each of the shield-forming dielectric protective film and the second, the third, and the fifth dielectric protective films is made of an infrared absorbing material.

9. A method of producing a thermal infrared detector having a thermal isolation structure and comprising a substrate having an infrared reflecting film formed on a surface thereof in each pixel area, a thin-film infrared detecting portion which is separated by a cavity from the surface of the substrate, which is provided for each pixel, and which absorbs an infrared ray incident thereto and generates heat to thereby detect incidence of the infrared ray as temperature change, and a beam separated by a gap from the infrared detecting portion and supporting the infrared detecting portion separated by the cavity from the substrate, and an electrode portion and a metal wiring each of which is made of a conductive material and which establish electrical connection between predetermined portions, the method comprising the steps of:

preparing the substrate having a contact pad;

forming, on a surface of the substrate on which the contact pad is present, the infrared reflecting film at a portion corresponding to the infrared detecting portion;

forming a first dielectric protective film throughout an entire surface of the substrate, including a surface of the infrared reflecting film;

forming, on the surface of the substrate on which the contact pad is present, a first sacrificial layer for forming the cavity;

forming a second dielectric protective film on a surface of the first sacrificial layer;

forming a heat detecting material thin film on a surface of the second dielectric protective film at a portion corresponding to the infrared detecting portion;

forming a third dielectric protective film throughout an entire surface of an exposed part of the second dielectric protective film except a part of the heat detecting material thin film;

forming openings in each of the first, the second, and the third dielectric protective film at a portion corresponding to the contact pad and in the heat detecting material thin film at a portion corresponding to the electrode;

forming a metal film throughout an entire surface of the third dielectric protective film and an entire inner wall of each of the openings;

patterning the metal film so that the third dielectric protective film is exposed to form the electrode of the infrared detecting portion and the metal wiring of the beam;

forming a fourth dielectric protective film on a surface of each of the metal wiring and the third dielectric protective film;

patterning the second, the third, and the fourth dielectric protective films so that the first sacrificial layer is exposed, to thereby form a first slit as a gap between the infrared detecting portion and the beam and a boundary slit as a boundary between adjacent pixels;

etching the fourth dielectric protective film on the infrared detecting portion so that the thickness of the fourth dielectric protective film is reduced, to thereby form a fifth dielectric protective film;

forming, on the surface of the fourth dielectric protective film, a second sacrificial layer for forming the first slit and the boundary slit each having an exposed surface of the first sacrificial layer at the bottom, a space between the beam and the shield covering the beam on an infrared incident side, and a space between the contact pad of the substrate and the shield;

forming an infrared absorbing film on a surface of the fifth dielectric

protective film and on a surface of the second sacrificial layer except a portion

forming, throughout an entire surface of the infrared absorbing film and on an exposed surface of the second sacrificial layer at a portion corresponding to the boundary slit, a shield-forming dielectric protective film for forming the shield;

patterning the shield-forming dielectric protective film so as to expose a part of the second sacrificial layer which corresponds to the boundary slit, thereby forming a second slit; and

removing the second and the first sacrificial layers through the second slit, the first slit, and the boundary slit.